

motivation by teaching that the disclosed grated carbon black has improved dispersibility in organic solvents and organic high polymers and by teaching its use in ink-jet inks. One skilled in the art at the time of the invention would have been motivated by a reasonable expectation of taking advantage of the improved dispersibility of the acidic grafted carbon black taught by Ikeda et al in the radiation curable ink jet ink compositions disclosed by WO '162."

As for rejection (2), the Examiner again notes that WO '162 does not mention the acid value or pH of the pigment employed. However, the Examiner concludes that "It would have been obvious to one skilled in the art at the time of the invention to employ an acidic carbon black taught by Nagai as the carbon black in the non-aqueous inks disclosed by WO '162. WO '162 teaches using carbon black pigments in the disclosed inks. Nagai teaches that acidic carbon black inks provide excellent secondary color reproducibility on plain paper even at high speed. One skilled in the art at the time of the invention would have been motivated by a reasonable expectation of taking advantage of the improvement in reproducibility taught by Nagai in the ink compositions and method taught by WO '162."

With respect, the applicants submit that neither of the Examiner's Section 103(a) rejections of the claims is warranted when one considers what the references actually teach the person skilled in the art as distinguished from what the applicants teach in the art.

Applicants' main claim (claim 1) reads as follows:

1. A non-aqueous, radiation-curable ink comprising pigment, dispersant and a liquid carrier, wherein the pigment has an acid value greater than 8 mg of NaOH per gram of pigment.

As will be evident, claim 1 requires the following six features to be present in the claimed inks:

1. non-aqueous;
2. radiation-curable ink;
3. comprising pigment;
4. and a dispersant;
5. and a liquid carrier; and
6. the pigment has an acid value greater than 8 mg of NaOH per gram of pigment.

The Examiner, as indicated above, has recognized that the applicants' claims are novel over WO '162. This reference does not disclose non-aqueous, radiation-curable, inks comprising a dispersant, liquid carrier and a pigment having an acid value greater than 8 mg NaOH/g.

In making rejection (1) above, the Examiner essentially argues that it would be obvious to employ the grafted carbon blacks of Ikeda et al. having a pH less than 7 in the inks of WO '162. However, the applicants respectfully note that in fact Ikeda et al does not teach grafted carbon blacks having a pH less than 7. The Examiner refers to Column 2, lines 24-32 and Column 3, line 48 to Column 8, line 38 of Ikeda as teaching the use of carbon black having an acid pH. However, Column 2, lines 24-32 do not mention pH and Column 3, line 48, to Column 4, line 38, mention pH only in relation to an intermediate used to prepare the final grafted pigments of Ikeda et al. The carboxy groups providing acidity are consumed by reaction with epoxy etc. groups.

Thus, Ikeda et al. would, if anything, suggest that carboxy groups should not be present in the final pigment. This is because Ikeda et al. teach that any carboxy groups which may be present should be irreversibly reacted with epoxy compounds. This reaction would convert acid groups to non-acidic groups. In this respect, the Examiner is referred to Ikeda et al., Column 5, lines 54 -62, which reads as follows:

"The carbon black which has the carboxyl group(s) as the functional group(s) on the surface thereof as described above proves particularly advantageous because this carboxyl group undergoes an irreversible thermal addition reaction with an epoxy group, a thioepoxy group, an aziridine group or an oxazoline group with a high yield and, owing to this addition reaction, and forms the covalent bond mentioned above between the carbon black moiety and the polymer moiety. "

In view of the above, the applicants respectfully submit that Ikeda et al does not disclose and does not provide any motivation to include a pigment having an acid value greater than 8 mg NaOH in non-aqueous, radiation curable inks. If anything Ikeda et al teaches that any carboxy groups should be reacted with epoxy groups etc., thereby rendering them non-acidic, before the pigments are fit for use.

For the reasons noted, the applicants submit that there is no motivation to combine WO '162 and Ikeda et al. However, even if combined, the applicants' inks are not obtained as there is no disclosure in the references of the applicants' requirement that the pigments have an acid value of greater than 8 mg of NaOH per gram of pigment.

The applicants have noted the Examiner's comment in this regard that unexpected reduction in nozzle loss shown in applicants' Table 2 is insufficient in scope to justify non-obviousness. The applicants respectfully submit that the claims define subject matter which is not obvious from WO '162 in view of Ikeda et al. for the reasons noted above even if there were no evidence of unexpected properties. However, the evidence the applicants have provided illustrates that their compositions do in fact demonstrate unexpected properties and further supports the patentability of the claims herein over WO '162 and Ikeda. Accordingly, reconsideration and withdrawal of the Section 103(a) rejection based on WO '162 in view of Ikeda et al. is requested.

The Examiner is also requested to reconsider rejection (2) above, i.e. the rejection of the listed claims as unpatentable over WO '162 in view of Nagai. These references do not suggest the applicants' invention or make it obvious.

More specifically, it is noted that WO '162 relates to curable dispersants which may be used in curable inks. These curable inks are not aqueous and therefore the colorants do not carry water solubilizing groups.

In contrast, Nagai relates to aqueous inks. Nagai therefore mentions colorants having water-solubilizing groups, for example, in the parts mentioned by the Examiner. However, Nagai does not disclose or even remotely suggest the use of pigments having an acid value greater than 8 mg NaOH/g in non-aqueous inks. Furthermore, It would be counter-intuitive to use pigments having an acid value greater than 8 mg NaOH/g in a non-aqueous ink.

In view of the foregoing, it is respectfully submitted that Nagai, which relates to aqueous inks, would not provide any motivation to include pigments having an acid value greater than 8 mg NaOH/g in non-aqueous inks.

Consistent with the foregoing, the applicants submit that both of the Examiner's Section 103(a) rejections should be withdrawn and the rejected claims allowed.

Favorable action with allowance of the application is requested.

Respectfully submitted,  
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